REMARKS

The Examiner has rejected claims 1-5, 8 and 10-12 under 35 U.S.C. 103(a) as being unpatentable U.S. Patent 5,436,673 to Bachmann et al. in view of U.S. patent 4,731,662 to Udagawa et al. In addition, the Examiner has rejected claim 9 under 35 U.S.C. 103(a) as being unpatentable over Bachmann et al. in view of Udagawa et al., and further in view of U.S. Patent 5,742,296 to Yamada et al.

The Bachmann et al. patent discloses video signal color correction based on color hue.

The Udagawa et al. patent discloses an image processing method for processing an image signal differently depending on the range of an image characteristic thereof relative to the range within which an output device can reproduce the image characteristic.

The Examiner has indicated that while Bachmann et al. teaches "receiving input picture signals" and "determining input luminance, saturation and hue parameter values of said input picture signals", Bachmann et al. does not teach "obtaining the output saturation parameter value by increasing the input saturation parameter value up to a maximum level" and "determining said maximum level using the input hue value and the output luminance parameter value such that clipping of a color driving value does not take place". The Examiner then states that Udagawa et al. teaches these limitations and notes col. 4, lines 22-68.

Applicants submit that the Examiner is mistaken. In particular, the noted section of Udagawa et al. states:

> "At step S11, a saturation histogram of an input color signal is formed by forming a distribution of pixels constituting an image frame for each hue signal H; in other words, the saturation distribution is checked with respect to each of a plurality of predetermined hues. Next, at step S12 the maximum saturation C(H)max and the minimum saturation C(H)min are detected for each hue signal H. At step S13, the difference between C(H)max and C(H)min and the maximum reproducing saturation C(H)L measured beforehand of the color printer for each hue signal H, are compared with each other. If C(H)max-C(H)min>C(H)L at step S13, then step S14 follows to perform a saturation compression process and obtain an output saturation C'(H) in accordance with the following formula.
>
> $$\frac{C(H)_L \cdot C(H)}{C(H)max - C(H)min} + C(H)min \rightarrow C'(H)$$
>
> "As above, the saturation compression process as shown in FIG. 6A is carried out. Thus, it is possible to conduct saturation compression without destroying chromaticity continuity.
>
> "If it is judged that at step S13 C(H)max-C(H)min≤C(H)L and at step S16 C(H)L≥C(H)max, it means that as shown in FIG. 6B the saturation range of the input image is fully within the reproducing saturation range of the printer. Therefore, C(H) is directly output as C'(H) at step S17 without performing a saturation conversion. Thus, it is possible to reproduce the input image characteristics without any change.
>
> "If it is judged that at step S13 C(H)max-C(H-)min≤C(H)L and at step S16 C(H)L <C(H)max, it means that as shown in FIG. 6C the maximum saturation of the input image exceeds the maximum value of the reproducing saturation range. In this case wherein the saturation is shifted to a higher range, the distribution histogram as a whole is shifted at step S19 in accordance with the following formula.
>
> "C(H)-(C(H)max-C(H)L)→C'(H)
>
> "With this process, it is possible to reproduce the saturation shift of the output image and give a

natural, visual impression due to the unchanged absolute value of the saturation range."

Applicants first would like to point out that there is no mention in Udagawa et al. of the output luminance parameter value, let alone the claim limitation "determining said maximum level using the input hue value and the output luminance parameter value in a saturation bound evaluation block such that clipping of a color driving value does not take place". Further, while Udagawa et al. discloses determining the output saturation (C'(H)), there is no disclosure or suggestion of increasing the input saturation up to a maximum level. Rather, Udagawa et al. merely detects the input maximum and minimum saturation for each hue signal.

The Examiner now states "In regard to output luminance parameter value, it should be noted that Udagawa passes the input luminance parameter value to the output color conversion matrix unchanged so that the output luminance equals the input luminance and is used in the color modifying methods and thus meets the limitations of claim 1. (See Udagawa figure 4)."

Applicants submit that while Udagawa et al. shows, in Fig. 4, that the input luminance parameter value passes unchanged from the encoder 111, through the CPU 113 to the masking circuit 116, there is no disclosure or suggestion that this luminance parameter value is used at all in the CPU 113 to determine the maximum level of the output saturation parameter value. Rather, Udagawa et al., as clearly shown in Fig. 5 and describes at col. 4, lines 22-68, determines the output saturation level based on the input hue, the

input saturation level at each hue value, and the maximum allowable saturation level of the printer $C(H)_L$. In contrast therewith, Applicants refer the Examiner to Fig. 2 of the subject application which shows the output luminance value Y' at the output of non-linear luminance processing block 32 being applied to the saturation bound evaluation block 34, as well as the specification on page 5, line 30 to page 7, line 16, where it is described in detail how the saturation bound evaluation block 34 uses the output luminance parameter value Y' to determine the maximum saturation value S_{max}.

Claim 4 includes the limitation "wherein the non-linear processing comprises the steps of:

determining a power depending on the hue parameter value; and

raising the input luminance parameter value to the power."

The Examiner states "...Bachmann further teaches wherein the non-linear processing comprises the steps of: determining a power (any desired function; '673; col. 4, in. 29-33) depending on the hue parameter value; and raising the input luminance parameter value to the power (any desired function; '673; col. 4, In. 29-33) (Y*KORR.LUM, '673; fig. 1, functional block 18)."

Applicants submit that since claim 4 depends from claim 1, the limitations of claim 4 cannot be taken in a vacuum. In particular, the output luminance parameter value then differs from the input luminance value by the raising of the input luminance parameter value to the determined power. This then affects the

determining of the maximum saturation level Smax in the saturation bound evaluation block 34. However, there is no disclosure or suggestion in Bachmann et al. and Udagawa et al. that the maximum saturation level is determined based on the **output** luminance value which differs from the input luminance value.

The Yamada et al. patent discloses an image processing method and apparatus therefor.

Claim 9 includes the limitation "the output saturation parameter value is substantially determined by the equation:

$$S' = S_{max}(S/S_{max})^{\gamma_h} \quad ,$$

where S is the saturation parameter value, S_{max} is the maximum saturation value, and γ_h is the power" where, according to claim 2, the power is determined based on the hue parameter value.

The Examiner has indicated:

> "Yamada, working in the same field of endeavor, however, teaches a method for the benefit of preventing over saturation of the S values in the corrected image, wherein a saturation-related output parameter value S'(y_o) that is substantially determined by the equation: S'= S_{max}*(s/S_{max})^{Yh} {Y_o=Y_1(1-(1- Y_P\Y_t)**Y_C Y_i} ('296; col. 6, In. 63-67, col. 7, ln. 1-2) where all the gamma values (saturations) are normalized to the value of 1 so that the form of this equation becomes the form of the instant application. In addition, y_t corresponds to S, y_P corresponds to S_{max} and y_j is approximately equal to S_{max} ('296; col. 6, ln. 25-45)."

However, Applicants submit that Yamada et al. does not supply that which is missing from Bachmann et al., i.e., "obtaining

the output saturation parameter value by increasing the input saturation parameter value up to a maximum level" and "determining said maximum level using the input hue value and the output luminance parameter value such that clipping of a color driving value does not take place".

In view of the above, Applicants believe that the subject invention, as claimed, is neither anticipated nor rendered obvious by the prior art, either individually or collectively, and as such, is patentable thereover.

Applicants believe that this application, containing claims 1-12, is now in condition for allowance and such action is respectfully requested.

Respectfully submitted,

by___/Edward W. Goodman/_____
Edward W. Goodman, Reg. 28,613
Attorney
Tel.: 914-333-9611